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09/830,928	05/24/2001	Katsusuke Shimazaki	109431	5074
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OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			EXAMINER CHEN, TIANJIE	
			ART UNIT 2652	PAPER NUMBER

DATE MAILED: 01/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/830,928

Applicant(s)

SHIMAZAKI ET AL.

Examiner

Tianjie Chen

Art Unit

2652

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 51-94 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 88-94 is/are allowed.
- 6) ☒ Claim(s) 51-60, 64-82 and 84-87 is/are rejected.
- 7) ☒ Claim(s) 61-63 and 83 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Non-Final Rejection

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claim 67 is rejected under 35 U.S.C. 102(b) as being anticipated by Akiyama et al (JP 10-81964).

With regard to claim 67, Akiyama et al shows a disk substrate for an optical disk in Table I, the substrate having an axis of rotation and a thickness of less than 0.8 mm, wherein a disk plane tilts at a tilt angle θ , which satisfies:

$$10 \text{ mrad} \leq \theta \leq 20 \text{ mrad},$$

with a plane perpendicular to the axis of rotation (English translation, [0015] line 7).

2. Claim 76 is rejected under 35 U.S.C. 102(b) as being anticipated by Yokouchi (US 5,581,423).

With regard to claim 76, Yokouchi shows a driving apparatus in Fig. 9 for driving a record disk 10 having a tilt and a hub 10a which is magnetically attracted (Column 9, lines 18-20) to press the record disk, including: a driving unit (Fig. 9); and a support for supporting a part of the record disk to adjust the tilt of the disk as the hub 10a presses the record disk 10 against the support, wherein the record disk has an axis of rotation and a disk plane substantially tilting with respect to plane perpendicular to the axis of rotation (Fig. 9; column 9, lines 12-29).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 51, 54, and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokota (US 5,987,003) in view of Takahashi et al (US 5,323,381).

With regard to claims 51 and 56, Yokota shows an optical disk (Column 1, lines 6-8) in Fig. 2 for recording information thereon and reproducing the information therefrom, including a disk substrate A1 having a hole 4 formed through the center thereof; a recording layer 2 (Column 2, line 61), which is formed on the substrate and on which the information is recorded; a recessed area 3, which has an area up to 30% of the total area of the disk substrate (Column 4, lines 58-60).

Yokota does not show a hub provided on the center of the substrate so as to be movable relative to the substrate; the hub having a diameter which is 26% or more than that of the optical disk; the optical disk satisfies a relationship of $Y/X \geq 0.015$ /(claim 51) or 0.02 (Claim 56), where X is a projected area of the substrate and Y is a contact area between the hub and the substrate.

Takahashi et al shows an optical disk (Column 1, lines 8-9) being housed rotatably in a cartridge case (Column 3, lines 14-15), having a hub 35 provided on the center of the substrate in a recessed portion so as to be movable (Figs. 14-17; column 9, lines 36-38) relative to the substrate.

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It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply hub taught by Takahashi et al into Yokota's device. The rationale is as follows: Yokota teaches that a disk with a recess and his substrate is for mounted on hub (Column 2, lines 2-3) but does not specify the hub. Takahashi et al teaches a disk with a hub in a recess and the structure would prevent deterioration of optical properties and be free from double refraction or the like defects (Column 3, lines 26-30). One of ordinary skill in the art would have been motivated to apply the hub taught by Takahashi et al thus improving optical property of the disk. In such constructed device, the area of the of the hub reaches 30% of the projected area, thus the hub would have a diameter which is more than 26% of that of the optical disk. Furthermore, since the area of the hub $S = 0.30 X$, and Figs 14-17 shows that the contact area $Y > 0.05/0.07 S$. Therefore, the optical disk satisfies a relationship of $Y/X \geq 0.015/(\text{claim 51})$ or 0.02 (Claim 56).

With regard to claim 54, Takahashi et al shows that the hub 35 having a convex center portion with a side wall, the side wall having a sloping at an angle between 130 and 160 degrees at half the height of the hub.

4. Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yokota in view of Takahashi et al as applied to claim 51 further in view of Abiko (JP 06-111518A).

With regard to claim 52, Takahashi et al show the disk is used in a cartridge, but fails to show the cartridge.

Abiko shows a disc cartridge case in Fig. 4, which defines a space therein, and a size of the width of the space is 300 or more % of a thickness of the substrate.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply the cartridge hub taught by Abiko into Yokota and Takahashi et al's device. The rationale is as follows: Takahashi et al teaches the disk is used with a cartridge, but does not show the cartridge. One of ordinary skill in the art would have been looking for a cartridge for his disk. Abiko shows a cartridge, which used with a disk having pretty much same structure as Takahashi et al's structure. One of ordinary skill in the art would have been motivated to apply the hub taught by Takahashi et al thus improving optical property of the disk.

5. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yokota, Takahashi et al, and Abiko, and further in view of Tanaka (US 6,014,365).

With regard to claim 53, Abiko shows an optical disk as described above, but fails to show that the cartridge case has a recess and a protrusion formed on the inner surfaces thereof which face the disk, and the recess and protrusion adjust airflow in the cartridge case while the disk is rotating and are arranged to diverge away from the center of the disk at angle between 5 and 90 degrees.

Tanaka shows a cartridge case in Fig. 3, having a recess and a protrusion 15a formed on the inner surfaces thereof, which face the disk, and are arranged to diverge away from the center of the disk at angle between 5 and 90 degrees.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to add the recesses and protrusions taught by Tanaka into the above device. The rationale is as follows: Tanaka teaches that by adding the protrusion, the disk is contained in the disk storing portion, with only the peripheral edges supported and in contact with the inner surface of the cartridge body when the

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disk passes through the disk inlet/outlet port (Column 6, lines 23-27). One of ordinary skill in the art would have been motivated to include the protrusions to protect the disk.

6. Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yokota and Takahashi et al as applied to claim 51 above, further in view of Yoo et al (US 6,222,812).

With regard to claim 55, Yokota and Takahashi et al do not show the optical disk having a thickness of 0.7 mm/0.8 mm or less.

Yoo et al shows a DVD disc wherein the substrate has a thickness of 0.6 mm, which is less than 0.7 mm/0.8 mm.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to expect set the thickness being 0.6 mm. The rationale is as follows: Yokota discloses an optical disc, but it is an old invention. At the time the invention was made both 1.2 mm and 0.6 mm are standard thickness in industry. One of ordinary skill in the art would have been motivated to include 0.6 mm as the thickness to make the disk being able to use for the apparatus in the market.

7. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yokota and Takahashi et al, as applied to claim 56 above, and further in view of Tsai (US 6,266,298).

With regard to claim 57, Yokota shows the optical disk is used in optical disk (Column 1, lines 6-8); but does not specify the speed.

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Tsai shows an optical disk apparatus, wherein the disk is an apparatus, which uses optical disk and rotates at a speed of 2,400 or more rpm for recordation and reproduction (Column 2, line 37-39).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to set the speed at 2400 rpm or more as taught by Tsai. The rationale is as follows: Yokota teaches that the disk is used for an optical disk. Tsai shows the optical disk is commonly operated at a speed more than 2400 rpm (Column 2, lines 37-39). One of ordinary skill in the art would have been motivated to set the speed at 2400 rpm or more to operate the disk at high speed.

8. Claims 58, 66, 67, 68, and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokouchi (US 5,581,423) in view of Kasahara (US 5,592,459).

With regard to claims 58 and 66; Yokouchi shows a disk 10 (Column 9, line 9) with substrate in Fig. 9 for a disk (Column 1, lines 5-10) which is to be mounted on a magnetic mounting part 32 (Column 9, lines 18-19) of a driving apparatus for driving the disk including: a disk tilting substantially with respect to a plane perpendicular to an axis of rotation of the substrate (Fig. 9); and a hub 10a (Column 6, line 55) which is attractable by the magnetic part 32 to press the disk from Fig. 5A in such manner that the disk plane becomes horizontal (Column 9, lines 18-29) when the disk is mounted on the mounting part of the driving apparatus.

With regard to claims 58 and 66, Yokouchi does not specify the disk is an optical disk.

Kasahara shows a magnetic shucking device, which is used for an optical disk (Column 4, lines 23-28).

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It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply the magnetic chucking mechanism to an optical disk. The rationale is as follows: Yokouchi teaches that the device with a magnetic chucking mechanism can be used for various disks (Column 1, lines 21-23). Kasahara shows that a magnetic chucking mechanism can be used for an optical disk, which provides a stable driving (Column 4, lines 23-28). One of ordinary skill in the art would have been motivated to apply the chucking mechanism taught by Yokouchi for an optical disk for providing stable driving.

With regard to claim 67, the above constructed Yokouchi and Kasahara's device includes a disk substrate for an optical disk, the substrate having an axis of rotation and a thickness of less than 0.8 mm, wherein a disk plane tilts at a tilt angle θ , which satisfies:

$$10 \text{ mrad} \leq \theta \leq 20 \text{ mrad},$$

with a plane perpendicular to the axis of rotation (in Yokouchi, column 9, lines 3-17).

With regard to claim 68, as described above, Yokouchi and Kasahara show that the hub can be magnetically attracted.

With regard to claim 75, the above constructed device includes an optical disk with a disk substrate as described above.

9. Claims 59, 72, and 78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokouchi (US 5,581,423) in view of Kasahara (US 5,592,459) as applied to claim 58, further in view of Fukakusa et al (US 6,256,283).

With regard to claims 59 and 72, Yokouchi and Kasahara's device includes an optical disk having a substrate, but the thickness is not specified.

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Fukakusa et al shows an optical disk with high density, which has a substrate having a thickness of 0.6 mm (Column 19, lines 42-46).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to use set the thickness of the optical disk for 0.6 mm as taught by Fukakusa et al. The rationale is as follows: Yokouchi and Kasahara's device includes an optical disk having a substrate, but the thickness is not specified.

Fukakusa et al teaches that 0.6mm thick substrate provides high density and it is also well known in the art that 0.6 mm is a standard thickness for optical disk. One of ordinary skill in the art would have been motivated to set the thickness as 0.6 mm for obtaining high density.

With regard to claim 78, the above constructed device, includes a record disk having an axis of rotation, a thickness of 0.6 mm, which is less than 0.8 mm; a disk plane tilting at a tilt with a plane perpendicular to the axis of rotation, the tilt angle θ satisfies the relationship of $1 \text{ mrad} \leq \theta \leq 20 \text{ mrad}$ (Yokouchi, column 9, lines 3-17).

10. Claims 60, 70, 71, and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokouchi (US 5,581,423) in view of Kasahara (US 5,592,459) as applied to claim 58, further in view of Abiko (JP 6-111518A).

Claim 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokouchi (US 5,581,423) in view of Abiko (JP 6-111518A).

With regard to claims 60, 70, and 79; Yokouchi shows in Fig. 9 the record disk with a hub 10a but fails to specify the structure.

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Abiko shows a disk in Fig 2, which includes an axis of rotation and a cylindrical receptacle 8 for holding the hub 7, the receptacle having a hole formed through the bottom thereof coaxially with the axis of rotation.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to use the structure taught by Abiko. The rationale is as follows: Abiko teaches that this structure provides a disk without subjecting to a swaging processing to greatly improve the reliability of the disk (PURPOSE SECTION).. One of ordinary skill in the art would have been motivated to use this structure to improve reliability.

With regard to claim 71, in the above constructed Yokouchi, Kasahara, and Abiko's device, the hub is held movably in the cylindrical receptacle.

With regard to claim 73, in the above constructed Yokouchi, Kasahara, and Abiko's device almost the whole projected area of the substrate contacts the hub (Fig. 4), therefore, the relationship of $Y/X \geq 0.015$ is satisfied, where X and Y respectively denote the projected area of the substrate and the contact area between the hub and the substrate.

11. Claims 81, 82, 84, and 85 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokouchi (US 5,581,423) in view of Abiko (JP 6-111518A) as applied to claim 79 further in view of Suzuki (US 5,058,094).

With regard to claim 81, Suzuki shows that the driving unit has a rotating shaft for rotating the record disk, the rotating shaft has a cylindrical recess formed coaxially in the top thereof for holding the cylindrical receptacle, the rotating shaft also has a side wall defining the recess, and the support is formed at the top of the side wall.

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With regard to claim 82, Suzuki further shows in Fig. 5B that the rotating shaft 4+5 protrudes axially from the bottom of the cylindrical recess, and the shaft includes: a first columnar protrusion having an outer diameter larger than that of the hole in the bottom of the record disk; and a second columnar protrusion protruding coaxially from the first protrusion axially of the rotating shaft.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply the structure taught by Suzuki. The rationale is as follows: Suzuki teaches that using such a structure, the occurrence of so-called misclamping can be prevented (Column 2, lines 10-15). One of ordinary skill in the art would have been motivated to do so to prevent misclamping.

With regard to claim 84, Suzuki further shows that the top of the cylindrical wall defining the recess of the rotating shaft extends radially outward.

With regard to claim 85, Suzuki further shows in Fig. 5B that when the record disk is mounted on the driving apparatus, the hole of the disk engages with the second protrusion to support the disk plane of the disk on top of the horizontal support, Yokouchi shows that the disk plane is kept at an angle of 10 or less mrad with a plane perpendicular to the axis of rotation of the disk as explained above.

12. Claims 80 and 86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokouchi in view of Teshima (5,867,346).

With regard to claim 80, Yokouchi shows the driving unit has a rotating shaft for rotating the record disk, but fail to show the support is formed at the top of the shaft.

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Teshima shows a driving unit in Fig. 3, wherein the support 8 is formed at the top of shaft 17.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to form the support on the top of the shaft as taught by Teshima. The rationale is as follows: Teshima teaches that it can suppress the warping of the disk (Column 2, lines 8-10). One of ordinary skill in the art would have been motivated to do so to suppress wrapping of the disk.

With regard to claim 86, Yokouchi further shows that the rotating shaft further includes a magnet 32 fitted therein for attracting the hub (Column 9, lines 18-19).

13. Claim 87 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yokouchi in view of Teshima as applied to claim 86, further in view of Sandstrom et al (US 6,154,441).

With regard to claim 87, Yokouchi shows a magnet, but fails to show it is an electromagnet.

Sandstrom et al Shows that the magnet is electromagnet (Column 11, lines 64-66).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include an electromagnet as an alternative. The rationale is as follows: Sandstrom et al shows the magnet can be an electromagnet, and electromagnet is also widely used in the art. One of ordinary skill in the art would have been motivated to include the electromagnet as an alternative.

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14. Claims 64, 65, 73, and 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokouchi and Kasahara as applied to claim 58 further in view of Yokota and Takahashi et al.

With regard to claims 64, 65, 73, and 74; Yokouchi shows an apparatus using an optical disk but does not show the details of the disk. As described above, the Yokota and Takahashi et al's disk is an optical disk, which can be used for Yokouchi's device. This disk has a relationship of $Y/X \geq 0.015$ is satisfied, where X and Y respectively denote the projected area of the substrate and the contact area between the hub and the substrate; an outer diameter that is 26 or more % of the outer diameter of the substrate for the reasons described above.

Allowable Subject Matter

15. Claims 88-94 are allowed.

Claims 61-63 and 83 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

- With regard to claim 88, none of the prior art in the record discloses a driving apparatus for recording and reproducing information by radiating light onto the recording surface of a record disk including a light source for irradiating the record disk with light; a tilt sensor for measuring a tilt angle of the recording surface of the record disk relative to the optical axis of the light incident on the disk; a rotating shaft for rotating the record disk; an electromagnet embedded in the rotating shaft; and a

controller for controlling the magnetic field intensity of the electromagnet based on the tilt angle detected by the tilt sensor, and for adjusting the force with which the hub presses the disk plane of the record disk.

- With regard to claims 61 and 83, none of the prior art in the record discloses a disk plane tilting substantially with respect to a plane perpendicular to an axis of rotation of the substrate and also tilts at an angle away from the bottom of the cylindrical receptacle and the angle θ satisfies the relationship of $1 \text{ mrad} \leq \theta \leq 20 \text{ mrad}$.
- Applicant asserts that by using this arrangement, while the disk is rotated, its recording surface is kept horizontal (Spec. p. 66, lines 18-19).

Response to Arguments

16. Applicant's arguments filed on 12/20/2004 have been fully considered but they are not persuasive.

- With regard to the rejection to claim 67, Applicant argues in pp. 10-11: Akiyama teaches the tangent of the angle θ of the disk holder as a measure of interest. Akiyama defines the angle of the periphery section of the holder as shown in Fig. 4 with the center of the holder.

Examiner's position: Figs 1 and 4 shows that the disk and the holder have the same tilt angle θ .

- Applicant argues: the tilts of the substrates manufactured in Examples of Akiyama are all less than 10 mrad.

Examiner's position: the claim does not recite that the substrate is manufactured. It can be on any stage in the process of manufacturing.

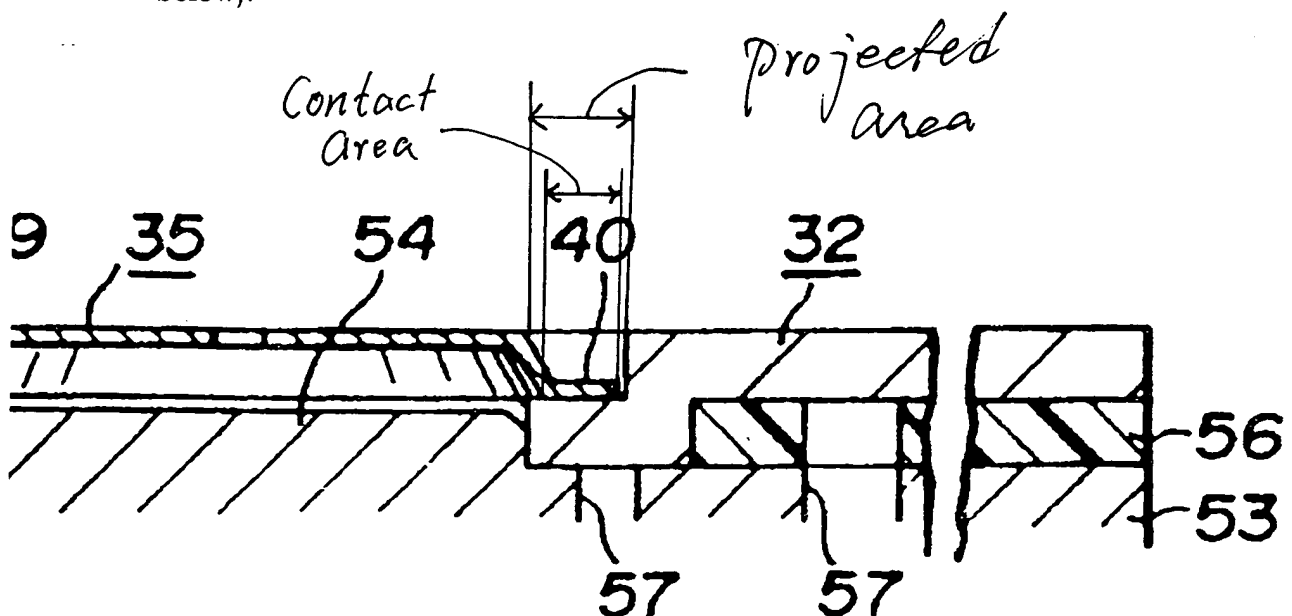
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- Applicant argues: although the recess disclosed in Yokota reaches as much as 30% of the overall area of the disk, there is nothing to suggest that a hub placed in that recess necessarily completely fill that recess or be greater than 26% of the area of the disk.

Examiner's position: since the recess has an area of 30%, then the diameter of the recess is square root of 0.3, which is 0.55 of the diameter of the disk. Prior art shows that the outer diameter of the hub is close to the diameter of the recess, which is much larger than 0.6 of the diameter of the recess, which would be 33%.

- Applicant argues: Figs. 14-17 of Takahashi depict, in a broken manner, the overall area of the disk, and the specification discloses no numerical relationship between the contact area between the hub and the substrate, and the overall projected area of the substrate.

Examiner's position: Takahashi depict that the contact area between the hub and the substrate is almost the overall projected area of the substrate, which is much larger than 0.05 or 0.07 as recited (See Figure below).

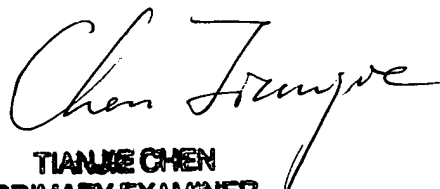


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tianjie Chen whose telephone number is (703) 305-7499. The examiner can normally be reached on 8:00-4:30, Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


TIANJIE CHEN
PRIMARY EXAMINER